Remarks

I. Status of claims

Claims 1-20 were pending.

Claims 21 and 22 have been added.

II. Objections to the drawings

The Examiner has objected to the drawings because the destination address 54 shown in FIG. 5 was not mentioned in the specification. The specification has been amended to mention the destination address 54. The objection to the drawings now should be withdrawn.

III. Claim objections

The Examiner has rejected claims 3, 5-8, 11, and 15-19 under 35 U.S.C. § 112, second paragraph, as being indefinite. These claims have been amended in ways that address the Examiner's concerns. The rejection of these claims under 35 U.S.C § 112, second paragraph, now should be withdrawn.

IV. Claim rejections

The Examiner has rejected claims 1-20 under 35 U.S.C § 102(b) over Andra (U.S. 6,349,331).

35 U.S.C. § 102(b) recites that "A person shall be entitled to an invention, unless - ... "the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States." Anticipation under 35 U.S.C. § 102(b) requires that each and every element of the claimed invention be present, either expressly or inherently, in a single prior art reference. EMI Group N. Am., Inc., v. Cypress Semiconductor Corp., 268 F.3d 1342, 1350 (Fed. Cir. 2001). Anticipation must be proved by clear and convincing evidence. Electro Medical Systems, S.A. v. Cooper Life Sciences, Inc., 34 F3d 1048, 1052 (Fed. Cir. 1994).

For the reasons explained in detail below, the rejection of claims 1-20 under 35 U.S.C. § 102(b) over Andra should be withdrawn because Andra neither expressly nor inherently discloses each and every element of the invention defined by any of these claims.

A. Claim 1

Independent claim 1 recites:

> Claim 1 (original): A communications module, comprising:
>
> a host interface port connectable to a media access control interface of a host system;
>
> a network medium interface port connectable to a network medium; and
>
> a protocol handler operable to identify a communications protocol compatible with the host system and to adaptively self-configure communications between the host interface port and the network medium interface port in accordance with the identified compatible communications protocol.

In support of the rejection of claim 1, the Examiner has taken the position that:

> ... Andra's multiple channel communication system utilizes all of these same elements. Andra's system has a host interface circuit (22) that is coupled to a media access controller (15), network ports (12) that are used to connect network communication devices (17) to network media (14), and an autonegotiation controller (18) which performs the functions of a protocol handler (column 3, lines 2240), such as autonegotiating a compatible protocol between the host system and its link partner (column 4, lines 51-53).

Contrary to the Examiner's position, however, the autonegotiation controller 18 is not "operable to identify a communications protocol compatible with the host system," as recited in claim 1.

In accordance with the IEEE 802.3u standard, autonegotiation is performed entirely within the PHY layer during link initiation (see, e.g., Internetworking Technologies Handbook, chapter 7, page 29, and IEEE 802.3-2002 Standard, § 28.1.3, first paragraph, both of which are listed on the information disclosure statement filed herewith). For example, Andra explains that the autonegotiation function takes place between each port 12_i and its link partner (see, e.g., col. 2, line 64 - col. 3, line 22; see also col. 4, lines 52-54: "Autonegotiation for a given port is complete when that port and its link partner successfully resolve mutual capabilities."). Thus, the Examiner's statement that the autonegotiation controller 18 auto-negotiates "a compatible protocol between the host system and its link partner" is not correct. Instead, in accordance with a proper understanding of Andra's disclosure, the autonegotiation controller 18 supports the autonegotiation that takes place within the PHY layer between each port 12_i and its respective link partner (see, e.g., col. 4, lines 14-15, 28-33, and 47-64).

Consequently, all the communications protocols that result from the autonegotiation function supported by the autonegotiation controller 18 involve identifying a communications protocol that is compatible with both the network interface port 12_i and its link partner. The operation of the autonegotiation controller 18 has nothing to do with identifying a communications protocol that is compatible with the *host system*. This is evidenced by the fact that Andra does not provide any disclosure whatsoever about identifying a communications protocol that is compatible with the *host system*. It reasonably can be inferred from Andra's silence on the matter that it simply is assumed that the communications between the multiple channel communication system 10 and the MAC 15 are in accordance with a compatible protocol by design. As a result, there is no need for any component of Andra's multiple channel communication system 10 to be "operable to identify a communications protocol compatible with the host system," as recited in claim 1.

For at least these reasons, the Examiner's rejection of claim 1 under 35 U.S.C. § 102(b) over Andra should be withdrawn.

It is noted that contrary to the Examiner's position, the connection between the host interface bus 28 and the host interface circuit 22 cannot possibly constitute "a host interface port connectable to a media access control interface of a host system," as recited in claim 1. In particular, in accordance with the Examiner's position (see FIG. 2 of Andra):

- the connections between the host interface bus 28 and the host interface circuit 22 and the MAC 15 respectively constitute the "host interface port" and the "media access control interface of a host system" recited in claim 1;
- one of the network medium interface ports 12_i constitutes the "network medium interface port" recited in claim 1; and

- the autonegotiation controller 18 constitutes the "protocol handler" recited in claim 1.

The autonegotiation controller 18, however, does not self-configure communications between the "port" where the host interface bus 28 connects to the host interface circuit 22 and the network interface medium port 12_i. Indeed, the autonegotiation controller 18 does not have any ability to configure communications between the MAC 15 and the host interface circuit 22. Instead,

> Autonegotiation controller 18 provides a common, sequential autonegotiation function for network communication devices $17_{(N-1):0}$. Autonegotiation controller 18 performs the autonegotiation function for each port sequentially. ... (col. 4, lines 47-51).

Given the Andra's description of the functionality of the autonegotiation controller 18, the connection between the host interface bus 28 and the host interface circuit 22 cannot constitute the "host interface port" recited in claim 1. Instead, since the autonegotiation controller 18 only has the ability to affect communications between the network interface ports 12_i and corresponding ones of the media independent interfaces 16_i, the media independent interfaces 16_i are the only elements of Andra's system that possibly could correspond to "a host interface port connectable to a media access control interface of a host system," as recited in claim 1.

B. Claims 2-12

Each of claims 2-12 incorporates the features of independent claim 1 and therefore is patentable over Andra for at least the same reasons explained above. Each of these claims also is patentable over Andra for the following additional reasons.

1. Claim 2

Claim 2 recites that "the protocol handler is operable to identify the compatible communications protocol based on at least one signal received through the host interface port."

Andra does not teach that the autonegotiation controller 18 is operable to identify a communications protocol compatible with the host system based on at least one signal received through the host interface port. As explained above, the media independent interfaces (MIIs) 16_i are the only elements of Andra's system that possibly could correspond to the "host interface port" recited in the claims. Since the autonegotiation controller 18 does not receive any signal through the MIIs 16_i, there is no way that the autonegotiation controller 18 possibly could identify a communications protocol compatible with the host system based on at least one signal received through the MIIs 16_i.

In support of the rejection of claim 2, the Examiner has stated that:

> … In Andra's system, the autonegotiation controller uses link code words, which are standardized signals in the Ethernet protocol, to establish a compatible communications protocol between the host system and its link partner through autonegotiation (column 4, lines 51-60).

The link code words, however, are not transmitted through the MIIs 16_i. In accordance with the IEEE 802.3u standard, the exchange of link code words takes place within the PHY layer between a port and its respective link partner. Furthermore, the operational mode information encoded in the link code words only relates to the operational modes supported by the remote PHY port; it does not reveal information about the host system. In accordance with the IEEE 802.3u standard, each link code word "identifies the operational modes supported by the remote device, as well as some information used for the Auto-Negotiation function's handshake mechanism" (IEEE Std 802.3-2002, Section Two, page 213).

For at least these additional reasons, the rejection of claim 2 under 35 U.S.C. § 102(b) over Andra should be withdrawn.

2. Claim 3

Claim 3 recites that "the protocol handler is operable to detect a data rate of a signal received from the host system through the host interface port and to identify the compatible communications protocol based on the detected data rate."

Andra does not teach that the autonegotiation controller 18 is operable to detect a data rate of a signal received from the host system through the host interface port and to identify the compatible communications protocol based on the detected data rate. As explained above, the media independent interfaces (MIIs) 16_i are the only elements of Andra's system that possibly could correspond to the "host interface port" recited in the claims. Since the autonegotiation controller 18 does not receive any signal through the MIIs 16_i, there is no way that the autonegotiation controller 18 possibly could detect a data rate of a signal received from the host system through the MIIs 16_i.

In support of the rejection of claim 3, the Examiner has stated that:

> … As part of the autonegotiation process in Andra's system, the host system and its link partner exchange link code words until both systems are transmitting at the same rate. The link code words also contain information about the communication abilities of the systems, including data rates. (column 12, lines 10-16). Link code words are fully described in clause 28.2.1.2 and Annex 28B.2 of the *IEEE 802.3u-1995 standard*, which Andra incorporates by reference. (Pertinent sections of this document will be provided herewith.)

The link code words, however, are not transmitted through the MIIs 16_i. In accordance with the IEEE 802.3u standard, the exchange of link code words takes place within the PHY layer between a port and its respective link partner. Furthermore, the operational mode information encoded in the link code words only relates to the operational modes supported by the remote PHY port. In accordance with the IEEE 802.3u standard, each link code word "identifies the operational modes supported by the remote device, as well as some information used for the Auto-Negotiation function's handshake mechanism" (IEEE Std 802.3-2002, Section Two, page 213).

For at least these additional reasons, the rejection of claim 3 under 35 U.S.C. § 102(b) over Andra should be withdrawn.

3. Claim 4

Claim 4 recites that "the protocol handler comprises a frequency detector configured to detect the data rate of the signal received from the host system through the host interface port."

Andra does not teach that the autonegotiation controller 18 includes a frequency detector configured to detect the data rate of the signal received from the host system through the host interface port. As explained above, the media independent interfaces (MIIs) 16_i are the only elements of Andra's system that possibly could correspond to the "host interface port" recited in the claims. Since the autonegotiation controller 18 does not receive any signal through the MIIs 16_i, there is no way that the autonegotiation controller 18 possibly could detect a data rate of a signal received from the host system through the MIIs 16_i.

In support of the rejection of claim 4, the Examiner has stated that:

> ... Andra's system, as with any Ethernet system, in having the ability to detect a data rate in a signal, must inherently have a frequency detector. As further described in clause 22.1.3 of the IEEE 802.3u-1995 standard, the only difference in various data rates is the nominal clock frequency.

The autonegotiation controller 18, however, does not receive any signal through the MIIs 16_i. Thus, there is no way that the autonegotiation controller 18 possibly could detect a data rate of a signal received from the host system through the MIIs 16_i. Furthermore, there is no reasonable basis for the Examiner's assumption that the autonegotiation controller 18 "must inherently have a frequency detector." To the contrary, based on Andra's description, one skilled in the art reasonably would have inferred that the autonegotiation controller 18 does not include a frequency detector because the functionality of the autonegotiation controller 18 does not include detecting the frequency (or data rate) of a signal; instead, in pertinent part, the autonegotiation controller only is concerned with determining whether "if the link partner of port [X] has provided link code words (LCWs) indicative of communication abilities which match the LCWs for port [X]" (col. 12, lines 15-17).

For at least these additional reasons, the rejection of claim 4 under 35 U.S.C. § 102(b) over Andra should be withdrawn.

4. Claim 5

Claim 5 recites that "the protocol handler is operable to recognize a pattern in a signal received from the host system through the host interface port and identify the compatible communications protocol based on the recognized pattern."

Andra does not teach that the autonegotiation controller 18 is operable to recognize a pattern in a signal received from the host system through the host interface port and identify the compatible communications protocol based on the recognized pattern. As explained above, the media independent interfaces (MIIs) 16_i are the only elements of Andra's system that possibly could correspond to the "host interface port" recited in the claims. Since the autonegotiation controller 18 does not receive any signal through the MIIs 16_i, there is no way that the autonegotiation controller 18 possibly could recognize a pattern in a signal received from the host system through the MIIs 16_i.

In support of the rejection of claim 5, the Examiner has stated that:

> ... As described above, part of the autonegotiation protocol used by Andra's system is the exchange of link code words. These link code words are contained within fast link pulse bursts, which are used to initiate autonegotiation (column 1, lines 42-47). In addition to the link code words, the fast link pulses contain an alternating pattern of clock and data pulses. In order to begin autonegotiation, Andra's system must be able to recognize this pattern.

The link code words, however, are not transmitted through the MIIs 16_i. In accordance with the IEEE 802.3u standard, the exchange of link code words takes place within the PHY layer between a port and its respective link partner. Furthermore, the operational mode information encoded in the link code words only relates to the operational modes supported by the remote PHY port. In accordance with the IEEE 802.3u standard, each link code word "identifies the operational modes supported by the remote device, as well as some information used for the Auto-Negotiation function's handshake mechanism" (IEEE Std 802.3-2002, Section Two, page 213).

For at least these additional reasons, the rejection of claim 5 under 35 U.S.C. § 102(b) over Andra should be withdrawn.

5. Claim 6

Claim 6 recites that "the protocol handler is operable to recognize the pattern in a data frame of the signal received from the host system through the host interface port."

In support of the rejection of claim 6, the Examiner has stated that:

> ... As described above, the fast link pulse contains a pattern that must be recognized in order for Andra's system to begin autonegotiation. This fast link pulse constitutes a data frame because it does contain data in addition to the clock signal.

The fast link pulses, however, are not transmitted from the host system through the MIIs 16_i to the autonegotiation controller 18. In accordance with the IEEE 802.3u standard, the exchange of fast link pulses takes place within the PHY layer between a port and its respective link partner.

For at least these additional reasons, the rejection of claim 6 under 35 U.S.C. § 102(b) over Andra should be withdrawn.

6. Claim 7

Claim 7 recites that "the pattern is an auto-initialization pattern in the signal received from the host system through the host interface port, and the protocol handler is operable to recognize the the auto-negotiation initialization pattern."

In support of the rejection of claim 7, the Examiner has stated that:

> ... As described above, the fast link pulse is the signal in Andra's system that initiates autonegotiation.

The fast link pulses, however, are not transmitted from the host system through the MIIs 16_i to the autonegotiation controller 18. In accordance with the IEEE 802.3u standard, the exchange of fast link pulses takes place within the PHY layer between a port and its respective link partner.

For at least these additional reasons, the rejection of claim 7 under 35 U.S.C. § 102(b) over Andra should be withdrawn.

7. Claim 8

Claim 8 recites that "the protocol handler is operable to auto-negotiate the compatible communications protocol with the host system."

In support of the rejection of claim 8, the Examiner has stated that:

> ... In Andra's system, once a compatible protocol is agreed upon by the host system and its link partner, the autonegotiation controller disables other potential communications protocols, leaving only the agreed upon protocol active between the linked systems (column 13, lines 24-29).

The operation of the autonegotiation controller 18 in the Link Good Check state 64 does not involve autonegotiation of a compatible communications protocol with the host system. In accordance with the IEEE 802.3u standard, autonegotiation does not take place between the port and the host system; instead, autonegotiation is performed entirely within the PHY layer during link initiation (see, e.g., Internetworking Technologies Handbook, chapter 7, page 29, and IEEE 802.3-2002 Standard, § 28.1.3, first paragraph, both of which are listed on the information disclosure statement filed herewith). For example, Andra explains that the autonegotiation function takes place between each port 12_i and its link partner (see, e.g., col. 2, line 64 - col. 3, line 22; see also col. 4, lines 52-54: "Autonegotiation for a given port is complete when that port and its link partner successfully resolve mutual capabilities.").

Thus, the autonegotiation controller 18 is not "operable to not auto-negotiate the compatible communications protocol with the host system," as recited in claim 8.

For at least these additional reasons, the rejection of claim 8 under 35 U.S.C. § 102(b) over Andra should be withdrawn.

8. Claim 9

Claim 9 recites that "the protocol handler is operable to obtain from the host system initial handshaking information specifying the compatible communications protocol."

In support of the rejection of claim 9, the Examiner has stated that:

> ... In Andra's system, the autonegotiation controller is linked to autonegotiation registers that contain information about the abilities of the host system to be used in the autonegotiation process (column 4, lines 10-16).

In col. 4, lines 10-21, Andra explained that:

> Autonegotiation controller 18 is coupled to each of the network communication devices 17.sub.(N-1):0 and to autonegotiation register file 19. Autonegotiation controller 18 maintains a set of six registers for each network communication device 17.sub.(N-1):0 in register file 19 to support the autonegotiation function. These registers are well known and include a read-write MII Control Register, a read-only MII Status Register, a read-write Autonegotiation Advertisement Register, a read-only Autonegotiation Link partner Ability Register, a read-only Autonegotiation Expansion Register and a read-write Autonegotiation Next Page Transmit Register, which are defined in IEEE 802.3u. ...

The Examiner's attention is called to the definitions of the registers provided in § 28.2.4 of the IEEE 802.3u standard (see pages 226- in the section of the IEEE 802.3u standard submitted with the information disclosure statement filed with this Amendment). In accordance with these definitions:

- MII control register (Register 0) provides the mechanism to disable/enable and/or restart Auto-Negotiation.
- The MII status register (Register 1) includes information about all modes of operations supported by the Local Device's PHY, the status of Auto-Negotiation, and whether the Auto-Negotiation function is supported by the PHY or not.
- The autonegotiation advertisement register contains the Advertised Ability of the PHY.
- The autonegotiation link partner register contains the Advertised Ability of the Link Partner's PHY.
- The autonegotiation expansion register contains various bits relating to the detection of a fault, the ability of the PHY and its link partner to support the Next Page function, the receipt of a page, and the ability of the link partner to participate in the autonegotiation function.
- The autonegotiation next page transmit register contains the Next Page Link Code Word to be transmitted when Next Page ability is supported.

Thus, contrary to the Examiner's statement, the autonegotiation registers described in col. 4, lines 10-21 of Andra do not contain information about the abilities of the host system to be used in the autonegotiation process.

The fact is that the autonegotiation controller 18 does not obtain initial handshaking information from the host system. In accordance with the IEEE 802.3u standard, autonegotiation does not take place between the port and the host system; instead, autonegotiation is performed entirely within the PHY layer during link initiation (see, e.g., Internetworking Technologies Handbook, chapter 7, page 29, and IEEE 802.3-2002 Standard, § 28.1.3, first paragraph, both of which are listed on the information disclosure statement filed herewith). For example, Andra explains that the autonegotiation function takes place between each port 12_i and its link partner (see, e.g., col. 2, line 64 - col. 3, line 22; see also col. 4, lines 52-54: "Autonegotiation for a given port is complete when that port and its link partner successfully resolve mutual capabilities.").

For at least these additional reasons, the rejection of claim 9 under 35 U.S.C. § 102(b) over Andra should be withdrawn.

9. Claim 10

Claim 10 recites that "the protocol handler is operable to transfer the initial handshaking information to a link partner connected to the network medium."

In support of the rejection of claim 10, the Examiner has stated that:

> ... Andra's autonegotiation controller reads the host information from the autonegotiation registers, and then places that information into the link code words that are used in the autonegotiation process, so that the link partner will know the host system's communication abilities (column 1, lines 42-47 and column 4, lines 10-16).

As explained above in connection with claim 9, the autonegotiation controller 18 does not obtain initial handshaking information from the host system. In accordance with the IEEE 802.3u standard, autonegotiation does not take place between the port and the host system; instead, autonegotiation is performed entirely within the PHY layer during link initiation (see, e.g., Internetworking Technologies Handbook, chapter 7, page 29, and IEEE 802.3-2002 Standard, § 28.1.3, first paragraph, both of which are listed on the information disclosure statement filed herewith). For example, Andra explains that the autonegotiation function takes place between each port 12_i and its link partner (see, e.g., col. 2, line 64 - col. 3, line 22; see also col. 4, lines 52-54: "Autonegotiation for a given port is complete when that port and its link partner successfully resolve mutual capabilities.").

In addition, contrary to the Examiner's statement, the autonegotiation registers described in col. 4, lines 10-21 of Andra do not contain initial handshaking information obtained from the host system to be used in the autonegotiation process (see the description of the contents of these registers in the preceding section of this Amendment). It is noted that the only ones of these registers that can be written to are the MII Control Register, the Autonegotiation Advertisement Register, and the Autonegotiation Next Page Transmit Register. Andra, however, does not teach anything that would have led one skilled in the art to believe that any of these registers could contain any information that was received from the host system except, perhaps, the MII control register, which does not contain any information specifying a communications protocol that is compatible with the host system.

For at least these additional reasons, the rejection of claim 10 under 35 U.S.C. § 102(b) over Andra should be withdrawn.

10. Claim 11

Claim 11 recites that "the protocol handler is operable to auto-negotiate the compatible communications protocol with the link partner."

Claim 11 depends from claim 10 and therefore is patentable over Andra for at least the same reasons explained above.

11. Claim 12

Claim 12 recites that "the protocol handler is operable to adaptively self-configure the communications between the host interface port and the network medium interface port in accordance with the auto-negotiated communications protocol compatible with both the host system and the link partner.

Claim 12 depends from claim 11 and therefore is patentable over Andra for at least the same reasons explained above.

C. Claim 13

Claim 13 recites elements that essentially track the pertinent elements of claim 1 discussed above. Therefore, claim 13 is patentable over Andra for at least the same reasons explained above in connection with claim 1.

D. Claims 14-20

Each of claims 14-20 incorporates the features of independent claim 13 and therefore is patentable over Andra for at least the same reasons explained above.

Each of these claims also is patentable over Andra for the additional reasons explained above in connection with claims 2, 3, and 5-9, respectively.

V. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 50-3718.

Respectfully submitted,

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